



11027E00

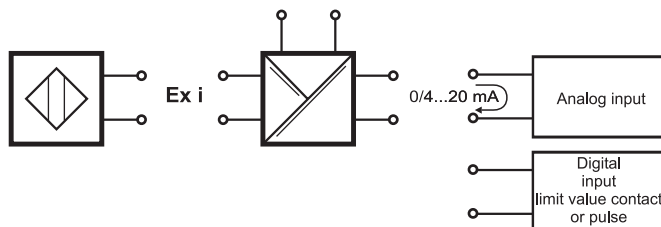
### Frequency Transmitter Type 9146

- Most compact device in its class, 2 versions available:
  - limit value switch, frequency/current conversion, impuls divider function within 17.6 mm width
  - dual channel frequency/current conversion within 17.6 mm width
- Line fault detection indicated by LED and potential free relay contact allows easy monitoring and speeds-up troubleshooting
- Broad input frequency range 0.001 Hz ... 20 kHz
- Galvanic isolation between input and output
- Installation possible in Zone 2

STAHL

The frequency transmitter allows to monitors the speed of rotating devices like fans, centrifuges, tube extruder, etc. in the hazardous area. The detected input frequency is processed in different ways:

- relay output with configurable set points
  - conversions into an proportional 0/4 mA ... 20 mA analogue signal
  - impuls output with optional frequency divider function
- The optional start-up delay allows to start a system without creating accidental alarms. The frequency transmitter can be easily configured by the ISpac Wizard.



11002E02



Selection table					
Version	Channels	Output	Limit value contact (per channel)	Pulse output	Ordering code
Frequency transmitter Type 9146	1	0/4 mA ... 20 mA	2 NO	one NO selectable	9146/10-11-12.
	2	0/4 mA ... 20 mA	without	--	9146/20-11-11.

Add. to ordering code		
	Screw terminal	9146/...-...-...s
	Spring clamp terminal	9146/...-...-...k
	Insulation displacement connectors	9146/...-...-...q

Technical Data		
Certificates	BVS 05 ATEX E 0171 X	
Explosion protection	⊕ II (1) GD [EEx ia] IIC/IIB and ⊕ II 3 G EEx nAC II T4	
Installation	In Zone 2 and in the safe area	
Safe maximum values (CENELEC)	Max. voltage $U_o$ Max. current $I_o$ Max. power $P_o$ Max. connectable capacitance $C_o$ for IIC / IIB Max. connectable inductance $L_o$ for IIC / IIB Internal capacitance $C_i$ and inductance $L_i$ Insulation voltage $U_m$	10.5 V 23.4 mA 61.4 mW (linear characteristic) 2.41 $\mu$ F / 16.8 $\mu$ F 63 mH / 230 mH negligible 253 V
	Further information and combinations of values, see certification.	
Power supply	Nominal voltage $U_N$ Voltage range Residual ripple within voltage range Nominal current (at $U_N$ ) 1 / 2 channels Power consumption (at $U_N$ ) 1 / 2 channels Power losses (at $U_N$ ) 1 / 2 channels Polarity reversal protection	24 V DC 18 V ... 31.2 V $\leq$ 3.6 $V_{SS}$ 55 mA / 75 mA 1.32 W / 1.80 W 1.32 W / 1.80 W yes
I.S. input	Input signal Current for ON / OFF Hysteresis No-load voltage Short-circuit current Input frequency Pulse width / pause Resolution	on regulations EN 60947-5-6 (NAMUR) $\geq$ 2.1 mA / $\leq$ 1.2 mA approx. 0.2 mA 8.5 V 8.5 mA 0.001 Hz ... 20000 Hz 25 $\mu$ s < 0.1 % of measurement range
Output	Output signal (configurable) Function range Connectable load resistance Operating mode	0/4 mA ... 20 mA 0 mA ... 20.5 mA 0 $\Omega$ ... 600 $\Omega$ counter, frequency by period, gate time
Limit values	Messaging Switching voltage Switching current On-resistance Reclosing lockout  Start-up delay Configuration	2 NO $\leq$ $\pm$ 30 V $\leq$ 50 mA $\leq$ 12.5 $\Omega$ (typical < 9,5 $\Omega$ ) reset through DIP-switch or „Power-Off“ (configurable) off / 1 ... 999 sec. via software ISpac Wizard
Pulse output	Frequency range Divido ratio input / output Switching voltage Switching current Configuration	0 kHz ... 5 kHz 1:1 ... 1:20000 $\leq$ $\pm$ 30 V $\leq$ 50 mA via software ISpac Wizard
	Activated pulse output allocates contact "B" (see connection diagram)	
Error limits	Accuracy, typical data expressed as % of basic range at $U_N$ , 23 °C  Linearity error $\leq$ 0.1 % Temperature influence $\leq$ 0.05 % / 10 K	

### Technical Data

<p>Error detection I.S. input</p>	<p>Open-circuit (EN 60947-5-6) Short-circuit (EN 60947-5-6) Behaviour of output</p> <p>Settings (Switch LF) Error detection Error messaging and power supply failure</p>	<p><math>I_E &lt;</math> 0.05 mA ... 0.35 mA <math>R_E &lt;</math> 100 <math>\Omega</math> ... 360 <math>\Omega</math></p> <p>configurable, default: short circuit: 3,8 mA open circuit: 20,5 mA activated / deactivated LED red „LF“ each channel - Contact (30 V / 100 mA) close to ground in case of error - pac-Bus, floating contact (30 V / 100 mA)</p>
<p>Galvanic isolation</p>	<p>Test voltage under regulations EN 50020 I.S. input to output I.S. input to power supply I.S. input to configuration interface I.S. input to error-contact I.S. inputs to each other</p>	<p>1.5 kV AC 1.5 kV AC 1.5 kV AC 1.5 kV AC --</p>
<p>Galvanic isolation</p>	<p>Test voltage under regulations EN 50178 Output to power supply Output to configuration interface Outputs to each other Error-contact to power supply and outputs</p>	<p>350 V AC 350 V AC 350 V AC 350 V AC</p>
<p>Electromagnetic compatibility</p>	<p>Tested under the following standards and regulations: EN 61326 (IEC/EN 61000-4-1...6 and 11; EN 55022 Class B); NAMUR NE 21 (IEC/EN 61000-4-1...6, 8 and 11; EN 55022 Class B)</p>	
<p>Ambient conditions</p>	<p>Ambient temperature Storage temperature Relative humidity (no condensation)</p>	<p>- 20 °C ... + 70 °C (watch instructions) - 40 °C ... + 80 °C <math>\leq</math> 95 %</p>
<p>Connection diagram</p>	<p>for 9146/10-11-12</p>	<p>Hazardous area   Safe area</p> <p>11019E02</p>
<p>Connection diagram</p>	<p>for 9146/20-11-11</p>	<p>Hazardous area   Safe area</p> <p>11020E02</p>



## Technical Data

Mechanical data	Screw terminals	Spring clamp terminals	Insulation displacement connectors
Connection one wire			
- rigid	0.2 ... 2.5 mm <sup>2</sup>	0.2 ... 2.5 mm <sup>2</sup>	--
- flexible	0.2 ... 2.5 mm <sup>2</sup>	0.2 ... 2.5 mm <sup>2</sup>	0.5 ... 1 mm <sup>2</sup>
- flexible, end covering sleeves (without / with plastic sleeving)	0.25 ... 2.5 mm <sup>2</sup>	0.25 ... 2.5 mm <sup>2</sup>	--
Connection two wires			
- rigid	0.2 ... 1 mm <sup>2</sup>	--	--
- flexible	0.2 ... 1.5 mm <sup>2</sup>	--	--
- flexible, end covering sleeves	0.25 ... 1 mm <sup>2</sup>	0.5 ... 1 mm <sup>2</sup>	--
Weight	approx. 160 g		
Mounting type	on DIN rail acc. to EN 50022 (NS35/15; NS35/7.5) or in pac-Carrier horizontal or vertical		
Mounting position	IP 30		
Casing protection class	IP 20		
Terminal protection class	PA 6.6		
Casing material	V0		
Fire protecting class (UL-94)			

## Dimension drawing (all dimensions in mm) - subject to alterations

	Dimension X
Screw terminals	108 mm
Cage clamp terminals	128 mm
Insulation cutting terminals	131 mm



## Accessories and Spare Parts

Designation	Description	Ordering code
Parameterising set IS pac - Wizard	<p>The software is used to commissioning, configuration and diagnosis on the ISpac Isolators Series 9146, 9162 and 9182. The configuration is by means of an IBM compatible standard PC.</p> <p>The user is guided through the device configuration process via a user interface designed comfortably, combined with a full context-sensitive online help feature. An online diagnostic window (device self test, process variable display etc.) is also available.</p> <p>For further information see operating instructions.</p> <p>Supplied: as CD-ROM; Parameterising software incl. parameterising cable.</p> <p>System requirements:</p> <ul style="list-style-type: none"> <li>• IBM compatible PC with MS Windows 98, NT, 2000, XP</li> <li>• CD-ROM drive</li> <li>• RS 232 C interface</li> </ul>	9199/20-01
Resistance coupling element	Allows to detect short circuit or open circuit if simple contact is applied.	3296050

### Customer Specific Set-up Sheet

Order-No.: \_\_\_\_\_ -Pos.: \_\_\_\_\_ Pieces: \_\_\_\_\_

- |                          |                  |                          |                       |                          |
|--------------------------|------------------|--------------------------|-----------------------|--------------------------|
| <input type="checkbox"/> | Type             | Channels                 | Output                | Trip point contact       |
| <input type="checkbox"/> | 9146/10-11-12.   | 1                        | 0/4...20 mA           | 2 NO                     |
| <input type="checkbox"/> | 9146/20-11-11.   | 2                        | 0/4...20 mA           | without                  |
| with:                    |                  |                          |                       |                          |
| <input type="checkbox"/> | Screw terminal s | <input type="checkbox"/> | Cage clamp terminal k | <input type="checkbox"/> |
|                          |                  |                          |                       | Insulating cutting q     |

	Standard	Channel 1	Channel 2
Signal Tag	Signal 1/2	_____	_____
<b>I.S. input</b>			
Operating mode	Frequency via period	<input type="checkbox"/> Counter <input type="checkbox"/> Frequency via period <input type="checkbox"/> Frequency via event (50ms) <input type="checkbox"/> Frequency via event (200ms) <input type="checkbox"/> Frequency via event (1000ms)	<input type="checkbox"/> Counter <input type="checkbox"/> Frequency via period <input type="checkbox"/> Frequency via event (50ms) <input type="checkbox"/> Frequency via event (200ms) <input type="checkbox"/> Frequency via event (1000ms)
Impulse type	Positive slope	<input type="checkbox"/> Positive slope <input type="checkbox"/> Negative slope	<input type="checkbox"/> Positive slope <input type="checkbox"/> Negative slope
Frequency range	0...1000 Hz	from _____ to _____ (max. 20 000 Hz)	from _____ to _____ (max. 20 000 Hz)
<b>Output</b>			
Signal	4...20mA	<input type="checkbox"/> 0...20mA <input type="checkbox"/> 4...20mA	<input type="checkbox"/> 0...20mA <input type="checkbox"/> 4...20mA
Fault behaviour	Fixed value (2.4 mA)	<input type="checkbox"/> hold last value <input type="checkbox"/> off <input type="checkbox"/> fixed value: _____	<input type="checkbox"/> hold last value <input type="checkbox"/> off <input type="checkbox"/> fixed value: _____
<b>Trip point settings for contact A (only 9146/10-11-12)</b>			
Signalling	deactivated	<input type="checkbox"/> activated <input type="checkbox"/> deactivated	---
Value	25%	_____ % (0 ... 100%)	---
Contact behaviour		<input type="checkbox"/> closes if signal > value <input type="checkbox"/> closes if signal < value <input type="checkbox"/> opens if signal > value <input type="checkbox"/> opens if signal < value	---
Hysteresis	1%	_____ % (0.1 ... 10%)	---
Start up delay	deactivated	_____ s (0 ... 999s) valid for both channels	---
Lockout function	deactivated	<input type="checkbox"/> activated <input type="checkbox"/> deactivated	---
<b>Trip point settings for contact B (only 9146/10-11-12)</b>			
Signalling	deactivated	<input type="checkbox"/> activating <input type="checkbox"/> deactivated	---
Value		_____ % (0 ... 100%)	---
Contact behaviour		<input type="checkbox"/> closes if signal > value <input type="checkbox"/> closes if signal < value <input type="checkbox"/> opens if signal > value <input type="checkbox"/> opens if signal < value	---
Hysteresis		_____ % (0.1 ... 10%)	---
Start up delay	deactivated	_____ s (0 ... 999s) valid for both channels	---
Lockout function	deactivated	<input type="checkbox"/> activated <input type="checkbox"/> deactivated	---
Pulse output	deactivated	<input type="checkbox"/> activated <input type="checkbox"/> deactivated	---
Pulse divider	1	_____ (1 ... 20 000)	---

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We reserve the right to make alterations to the technical data, weights, dimensions, designs and products available without notice. The illustrations cannot be considered binding.

